## What is claimed is:

A telecommunications apparatus, comprising:
a multi-finger Rake receiver having a serial stage and a parallel stage; and
a single bit quantizer on the serial stage.

estimated probabilities of the corresponding pulse samples.

2. The telecommunications apparatus of claim 1 in which: parallel branches of the Rake receiver are weighted; pulse samples from the single bit quantizer have estimated probabilities corresponding to different delays; and the weighting factors used in the Rake receiver are derived from the

3. The telecommunications apparatus of claim 2 in which the weighting factors are derived from a ratio of the estimated probability of a corresponding sample at the nth delay and the estimated probability that there is not a corresponding sample at the nth delay.

- 4. The telecommunications apparatus of claim 1 used with on off keying encoding/modulation scheme.
- 5. The telecommunications apparatus of claim 1 in which the single bit quantizer uses a decision statistic summed over samples of a received signal to determine whether a symbol is present.
- 6. The telecommunications apparatus of claim 5 in which the decision statistic uses a sum of a constant plus a function that depends on estimated probabilities of samples of the received signal being greater or less than a threshold.
- 7. The telecommunications apparatus of claim 1 used with a 2-ary encoding/modulation scheme.

- 8. The telecommunications apparatus of claim 7 in which the single bit quantizer analyzes a weighted sum of samples from a received signal to determine whether a symbol has been received.
- 9. The telecommunications apparatus of claim 1 used with a M-ary encoding/modulation scheme.
- 10. The telecommunications apparatus of claim 9 in which the single bit quantizer determines presence of a symbol in a received signal based on a maximum weighted sum of samples of a received signal.
- 11. The telecommunications apparatus of claim 1 in which the single bit quantizer operates using a search bin to determine presence of a symbol in a received signal, and shifts a search bin based on the estimated probability of a corresponding sample at the nth delay.
- 12. The telecommunications apparatus of claim 11, in which the single bit quantizer uses a clock synchronizing scheme using metrics with a set of tracking rules, where the metrics are based on a sum of magnitudes of a set of samples of the estimated probability of a corresponding sample at the nth delay.
- 13. The telecommunications apparatus of claim 12 in which the tracking rules are: If  $Q_{sL}>Q_{sH}$  then the search bin is shifted to the left, corresponding to decreased delay; If  $Q_{sL}<Q_{sH}$  then the search bin is shifted to the right, corresponding to increased delay; If  $Q_{sL}=Q_{sH}$  then the search bin is not shifted; and

If  $Q_s$ < a constant threshold then tracking is considered lost, and the single bit quantizer chooses between extending the search, reacquisition of a signal or repeating a search; and in which  $Q_{sL}$  is based on the sum across a first portion of the set of samples, and  $Q_{sH}$  is based on the sum across a second portion of the set of samples, and  $Q_s$  is the sum across both portions of the set of samples.

- 14. The telecommunications apparatus of claim 1 in which pilot tracking data used for deciding whether a sample represents a symbol 1 or not is used with decision feedback data samples from samples of a received signal.
- 15. The telecommunications apparatus of claim 1 in which the receiver uses a single bit quantized pilot signal to estimate propagation channel characteristics, whereby weighting coefficients may be derived for the Rake receiver by operating on received data samples.